6. Trochilus (——?) niveoventer.

Crown of the head and back of the neck bronzy green; back rich coppery bronze; wings purple-brown; upper tail-coverts reddish purple; tail purple-black; throat resplendent green; abdomen snow-white; flanks green; under tail-coverts greenish brown, margined with white; bill black, except the basal three-fourths of the lower mandible, which are flesh colour.

Total length, $3\frac{3}{4}$ inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. Near David; warm countries of Veragua.

Remark.—Nearly allied to *T. Edwardi* and *T. erythronotus*; from the former, however, it differs in the colour of the tail, and from the latter in the white colouring of the breast.

July 9, 1851.

John Gould, Esq., F.R.S., in the Chair.

The following papers were read:—

1. On the generic subdivision of the Bovidæ, or Hollow-horned Ruminants. By H. N. Turner, Jun.

In the series of observations upon the Ungulate Mammalia, of which I attempted last winter to lay before the Society the more general results, my attention was also in some measure directed towards the detailed arrangement of those portions of the order which have generally proved subjects of difficulty. Of these, the classification of the *Bovidæ*, or hollow-horned Ruminants, has certainly been the greatest, since they form a well-marked natural group, including a great variety of forms, with but few remarkable differences of structure. I soon found, however, that even setting aside some of the more strikingly-modified genera, the distinctions afforded by the skull were much more decided than any that I could find among the *Cervidæ*, which, from their being less rich in number and variety, were always easier to subdivide correctly. Not having been able at that time to observe the skulls of certain of the more remarkable forms, I set the matter aside for better opportunities; and now that the large and interesting collection of hunters' spoils which Mr. Roualeyn Gordon Cumming has brought together, and is at present exhibiting in London, has given me the opportunity of supplying some of these desiderata, I venture, although there are yet a few points I could wish to ascertain, to lay this portion of my researches before the Society.

There cannot be a doubt that the horns present the best and most readily discernible characters, or that, when the genera are once correctly determined, they may be pretty easily defined by the variations of these parts alone; but it has long since been seen how the con-

sideration only of the horns has led to very unnatural approximations. For example, Cuvier associates the Addax with the Indian Antelope; and Mr. Blyth, his translator, inserts his belief that it is more allied to the Coudou, which I think modern naturalists will allow to be equally wide of the truth. Again, the species forming the genera *Ægocerus* and *Nemorhœdus* of Major Smith are placed together in the 'Règne Animal,' and Mr. Blyth hints that the Anoa may be allied to the Oryx.

It is certainly remarkable, that while the teeth have contributed so important a share in the characters by which the mammalia have been arranged by various authors, they should have been so entirely overlooked in the members of the present division; for notwithstanding the great uniformity and strongly-marked character pervading the Ruminant dentition, very decided characters may frequently be found in the form and direction of the incisors, and in the presence or absence of the supplemental lobe in the molars; and it is the more to be wondered at when we consider that the incisors, from their position, may often easily be seen in dried specimens, and that the character alluded to in the molars has been found of considerable value in the interpretation of fossil remains. The remaining characters I shall have to bring forward consist of certain little details of structure in the skull, which are very easy to be perceived, and which, as I have found them constant in those groups which I have characterized by their means, I trust may meet with due consideration from naturalists.

Of late years, while some zoologists have remained content to call all hollow-horned Ruminants that are neither oxen, sheep, nor goats, by the generic name *Antilope*, another class have run into the extreme of the modern fashion by using every trifling external difference visible in dried skins, or recorded in books (sometimes not even excepting size and colour), to divide them so extensively, that the characters of the genera become more difficult to remember than those of the species. Considering the difficulty of observing many of these characters in dry specimens, and of bearing such trivial details in the memory, it is not to be wondered at that many errors of observation have crept in, a few of which I will point out as I proceed, limiting myself in my own diagnoses to the characters of the skull and horns. There is no doubt that the suborbital sinus, improperly called "lacrymal sinus" (translated into "tear-pit" by some authors, "tear-bag" by Mr. Gray), will form a valuable means of distinction when its structure in all the genera has been sufficiently observed upon fresh individuals, or on the parts preserved in fluid, provided that we do not attach too much importance to its relative dimensions; but although its dried appearance may assist discrimination, we cannot venture to describe it. As to inguinal pores and interdigital pits, it must always be difficult, and frequently impossible to determine their presence or absence in specimens that are dried and mounted. Tufts upon the joints of the limbs, and the extent of bare space upon the muzzle, are certainly much too trivial to warrant generic distinction, and never mark out any particular natural group.

The last attempt to arrange this extensive family in subordinate groups is that of Mr. Gray, published in the eighteenth volume of the 'Annals and Magazine of Natural History.' His preliminary remarks, though brief, appear to me quite sufficient to dispose of the arrangements previously set forth, therefore I will content myself with the consideration of his own. The two primary divisions, which are founded only upon the horns, certainly do not indicate any very natural affinities, since, taking the whole structure into consideration, the *Antilopeæ* of Mr. Gray are not more closely allied to the *Boveæ* than they are to the members of the second primary division, nor do the *Strepsicereæ* ally themselves particularly to the Sheep and Goats. With regard to the subdivision of the *Antilopeæ*, he is certainly right in separating the "Antelopes of the Desert" as a group, although there is no doubt that some of the divisions of the "Antelopes of the Fields" are equally as distinct from each other as they are from the former. The division of the latter group into "True Antelopes," "Caprine Antelopes," and "Cervine Antelopes," also possesses some merit; but the genera *Capricornis* and *Nemorhœdus* are very distinct from the other Caprine Antelopes, and the genus *Eleotragus* (*Redunca* of Major Smith) is very distinct from the other true Antelopes, and ought, as I am quite convinced, to include the genus *Kolus* of Dr. Andrew Smith, placed by Mr. Gray among his Cervine Antelopes, and consisting of species not known at the time Major Smith was engaged in these researches.

It will be universally admitted, that for the generic division of the Ruminants, zoology is most indebted to Major Smith, and in the course of my observations I have found reason to reject but few of the divisions proposed by him as subgenera, and few, if any, in my opinion, need be added. As I thus propose to curtail the list of genera adopted by Mr. Gray, and to separate certain of them from those with which he has associated them, several will stand alone; and of those which do ally themselves together, no group seems to manifest that particular relationship with other groups which should warrant us in separating the family, as Mr. Gray has done, into divisions of a primary, secondary, tertiary, and in some cases even a fourth and fifth degree of rank.

I will, therefore, while enumerating the characters which I have observed in the genera I propose to adopt, point out which of them appear to constitute groups, and mention those species which, from the inspection of entire specimens, skulls, or at least horns, I feel warranted in referring to the genera under which I place them. As I have seen nothing to guide me to a particular linear arrangement, any naturalist who may be pleased to adopt my divisions is at liberty to place the groups, and the genera contained in each, in whatever order he may think most convenient.

I will first proceed to the "true Antelopes" of Mr. Gray, excluding the genus *Eleotragus*. They all have the horns round, the middle incisors expanded at their summits, the others being bent outwards to make room for them, and the molars without supplemental lobes. The infraorbital depression when existing upon the skull is gene-

rally suddenly pressed in before the orbit. The genera are as follows:—

ANTILOPE.

No suborbital fissure nor fossa*, but a wide opening on the side of the muzzle, between the maxillary and intermaxillary bones; the masseteric ridge rising before the orbit; the auditory bulla large and prominent, with only a small groove on its outer side to receive the attachment of the stylohyal bone; the occiput broad, somewhat produced downwards; its basal portion with the posterior pair of tubercles broad, the anterior ones small. Molars without the supplemental lobe.

Horns annulated, curving outward from the base, then bending backwards and towards the tip upwards.

Hab. South Africa.

A. Melampus.—Of this single species, to which modern zoologists have confined the old generic name, I have only seen skulls of the male, in Mr. Cumming's collection: the lower jaw, as in most of his skulls of Ruminants, being wanting in all of them, I could not ascertain the character of the incisive teeth.

Major Smith assigns a suborbital sinus to this genus, making the principal distinction from the next to consist in the absence of horns in the female, thus associating with it the *gutturosa* and *colus*, belonging properly to the next genus,—the *cervicapra*, which it seems most convenient to separate,—and the *adenota*, which I must now refer to the genus *Eleotragus*. With his *A. forfex* I am at present unacquainted. *Melampus* alone remains, to which Mr. Gray rightly assigns no "tear-bag;" this, together with the horns, must be the external character of the genus, if, indeed, it be essentially distinct from the Gazelles, for the horns might be considered as a distorted modification of the lyrate type, and some species of that genus seem to want the suborbital sinus.

GAZELLA.

A suborbital fissure, and a moderate, or very slight fossa, suddenly pressed in before the orbit; the masseteric ridge rising before the orbit; the auditory bulla large and prominent; the basioccipital bone having its tubercles moderately or but little developed; the median incisors expanded at their summits; the molars without supplemental lobes.

Horns annulated, more or less resembling an inverted lyre; that is, bending a little outwards soon after their origin, and again inwards towards the tip.

Hab. Eastern Europe, Asia and Africa.

* I here use these terms with reference only to the skull, the fissure being that opening existing in most Ruminants, filled up during life by membrane, between the nasal, frontal, lacrymal and maxillary bones; and the fossa, the depression upon the surface of the lacrymal bone immediately before the orbit, generally affording some indication as to the existence and structure of the suborbital sinus.

G. dorcas.
G. Bennettii.
G. euchore.
G. gutturosa.
} Of these species I have seen skulls.
G. subgutturosa.
G. Sœmmeringii.
G. mhorr.
G. colus.
G. kemas.

Several of the so-called species that are closely allied in size and colour to *G. Dorcas*, appear to me to be merely varieties, as some of them have been considered by the older naturalists.

This genus seems prone to exhibit in certain species inhabiting more temperate regions, enlargements of, or appendages to, the respiratory passages; for example, the enlarged larynx of *G. gutturosa*, the elevated nose of *G. colus*, and the appendages to its sides in the Chiru (*G. kemas*); these seem to be physiological adaptations, in no case marking a group, and therefore insufficient to warrant generic distinction, which has been made in the two latter instances. However, not having as yet seen entire skulls of these species, I retain them provisionally in this genus, judging by the horns. I think few naturalists will set forth, with Mr. Gray, the colour of the horns of the Saiga as a generic character. Even in the *G. Bennettii*, so closely allied to *G. dorcas*, Mr. Hodgson states that the suborbital sinus is wanting, and he places the animal in a distinct genus, *Tragops* (afterwards altered to *Tragomma*), on account of this difference; while Colonel Sykes, the original describer of the species, affirms that it exists, though of very small size. Mr. Hodgson also denies it to the Chiru, which forms his genus *Panthelops*, and to which he assigns only five molars in each series.

Cervicapra.

A small suborbital fissure, and a very large fossa; the tubercles and median groove of the basioccipital bone well-developed. The other cranial characters as in *Gazella*.

Horns annulated, spirally twisted.

Hab. India.

C. bezoartica.

The remainder of this group, if we exclude the *Cephalophi* and the four-horned Antelopes of India, consists of a number of small species, apparently nearly allied, forming the subgenera *Tragulus* and *Neotragus* of Major Hamilton Smith. These are very distinguishable by the former having vertical, the latter recumbent horns; to the former, however, must be added the *Ourebi* (*A. scoparia*), from his subgenus *Redunca* (*Eleotragus*). Mr. Gray divides them into several genera, depending upon the presence or absence of inguinal pores and knee-tufts, the shape of the hoofs, the presence or absence and form of the "tear-bag," the condition of the fur; and one genus, founded upon two very young specimens, is characterized by the absence of the lateral rudimental hoofs. Most of these characters I must decidedly reject; and as I do not consider the evidence of dried skins quite satisfactory with regard to certain others, and have as yet

seen skulls of only two species, I will content myself at present with adopting only the two genera of Major Smith; using however, for the first one, Mr. Gray's generic name *Oreotragus*, without at present wishing to enter into the question of its right to supersede that of *Tragulus*, because the latter name has been also used by Mr. Gray for a group of small Musk Deer, needlessly separated from the Meminna.

I do not see sufficient in the small horns contained in the Museum of the College of Surgeons to warrant the adoption, as a genus, of Major Smith's subgenus *Raphicerus*. I will not attempt to conjecture to what species they may belong: they show nothing to prevent their ranking among the *Oreotragi*; and their locality, said to be the East Indies, while all the members of this genus are African, is not known with certainty.

Oreotragus.

A small suborbital fissure, with a large deep fossa suddenly pressed in before the orbit; the masseteric ridge rising a little before the orbit; the auditory bulla rather large and prominent; the basioccipital bone flat and smooth; the median incisors expanded at their summits, and the molars without supplemental lobes.

Horns small, placed forwards, vertical.

Hab. Africa.

O. saltatrix.
O. scoparius. } Of these two species I
O. tragulus. } have seen skulls.
O. melanotis.

Neotragus.

Horns recumbent.

Hab. Africa.

N. saltianus.—Of this animal I have seen no skull, but adopt for the present Major Smith's division, as the different direction of the horns is well-marked. It has the suborbital sinus, however, although its absence is assigned as a character by Major Smith. Of the other species included in the subgenus, I have seen but the two young specimens upon which Mr. Gray has founded his genus *Nanotragus*; they having no horns, I will not here venture to point out their location. The lateral rudimental hoofs are also wanting in at least one species of the last genus, the *Oreotragus Tragulus*, which Mr. Gray places in his genus *Calotragus*.

The skulls of the species of the two following genera are distinguished from those of the preceding ones by their having no suborbital fissure, and the fossa being large and not so suddenly pressed in in front of the orbit; and by the horns (or at least, in one case, the principal pair) being thrown back quite to the posterior edge of the frontal bone.

Cephalophus.

No suborbital fissure, a large fossa occupying the whole side of the

cheek; the nasal bones expanded behind, reaching over a little way into the fossa. The other cranial characters as in *Oreotragus*.

Horns placed far back, inclined backwards.

Hab. Africa.

C. mergens.	*C. Maxwellii.*
C. coronatus.	*C. monticola.*
C. silvicultrix.	*C. punctulatus.*
C. Ogilbii.	*C. grimmia.*
C. Natalensis.	*C. Whitfieldii.*
C. rufilatus.	

I have taken this list of species from Mr. Gray's paper on the genus, published in the same volume of the 'Annals and Magazine of Natural History,' omitting a few that seem to me likely to prove varieties, and adding two, which I find named in the Museum, and not included in his paper. I have only seen skulls of two or three species, but no one will dispute the limits of this very distinct genus.

TETRACERUS.

The nasal bones not expanded; the other cranial characters the same as in *Cephalophus*, with the addition of a second pair of horns of small size, placed over the orbits.

Hab. India.

T. quadricornis.	*T. subquadricornis.*

ELEOTRAGUS.

Nasal opening rather lengthened, the nasal processes of the intermaxillary bones long, yet not always reaching the nasal bones; a large infraorbital fissure, but no fossa; the masseteric ridge ascending rather high; the auditory bulla large and swollen; the basioccipital bone with its median groove and tubercles well-developed; the median incisors expanded at their summits; a well-developed supplemental lobe in the first true molar of each jaw, and usually more or less appearance of it in those behind.

Horns inclining backwards and outwards, transversely wrinkled, gently curving upwards, and a little inwards towards the tip.

Hab. Africa.

E. reduncus.	*E. adenota.*
E. isabellinus.	*E. sing-sing.*
E. capreolus.	*E. ellipsiprymnus.*
E. arundinaceus.	*E. leché.*

I have seen skulls of the four preceding the last-named.

It is quite evident, both from the structure of the skull and horns, and from the general external appearance and markings, that the *Antilope adenota* of Major Smith, and certain large species forming Dr. Andrew Smith's genus *Kolus*, belong truly to this form, and that in the latter case, at least, naturalists must have been deceived by mere dimensions. The similarity of character between the horns of the *Adenota* and those of the other species is very recognizable, al-

though Major Smith, judging by these parts alone, supposed them to belong to the lyrate type. The species does not appear among those mentioned in Mr. Gray's paper in the 'Annals and Magazine of Natural History,' but from the name and place assigned to the specimen in the British Museum, he appears to have evaded the difficulty by constituting it a genus of itself, which is placed near the genus *Kolus*, the genus *Eleotragus* (as in his paper) being far removed. The skull in the Museum, although the occiput is lost, bears full evidence of its real affinity. Among the interesting additions to South African zoology discovered by those travellers who have visited the great lake recently discovered in that region, an undescribed species of Antelope*, of which a beautiful skin was recently brought before the Society, will perhaps assist the more sceptical in osteological characters in arriving at a just conclusion on this point, since, while it has the stature and lengthened horns of the *ellipsiprymnus*, it has the brilliant colour and the external marks (particularly the dark stripe down the fore-leg) which characterise the smaller species.

This genus does not seem to show any particular affinity for any of the rest, and forms a well-marked group, of which the species are scattered over various parts of Africa, and are mostly noted for their predilection for the vicinity of water.

I here again adopt Mr. Gray's generic name, to avoid the necessity of altering the name of one of the species, the *E. reduncus*.

STREPSICEROS.

The nasal opening of moderate size; a suborbital fissure, but no fossa; the masseteric ridge not extending high; the auditory bulla swollen and prominent; the basioccipital bone with its anterior and posterior pairs of tubercles well-developed, the former separated by a deep median groove; the median incisors expanded at their summits; the molars without supplemental lobes.

Horns inclined backwards from the base, twisted, with one or more longitudinal angular ridges.

Hab. Africa.

S. cudu.
S. euryceros.
S. Angasii.
S. oreas.
S. Derbianus.
S. scriptus.
S. silvaticus.
S. decula.

The general aspect of the skull in this group reminds one a little of that of the Deer. The species all agree very closely, both in structure of the skull, and in the direction, twisting, and ridges of the horns, the Coudou differing only in having the spiral wide and open, and in the horns being confined to the male, while the Eland is only a gigantic representation of the smaller species. *S. euryceros*, *S. Angasii*, and a species most probably distinct from the rest, of which Capt. Allen brought a skull from the Bight of Biafra, show an intermediate condition of the horns; and in *S. Angasii*, at least, they are known to be wanting in the female. Major Smith himself has here

* Since named *Kolus leché* by Mr. Gray.

been deceived by size, and been led to place the subgenus *Tragelaphus* under his genus *Antilope*, and the others under his genus *Damalis*; even availing himself of stature, and in the case of the Coudou, of a white streak over the eyes, to help out the meagre distinctions. In associating the Nyl-Ghau with these animals, Mr. Gray has even allowed colour and marking to deceive him, for in this animal the horns are not even spiral; but in another respect the characters assigned to his *Strepsicereæ* agree with the Nyl-Ghau, and *not* with the others, which certainly have no suborbital sinus, nor have any of them an ovine muzzle, by which Mr. Gray distinguishes the larger genera from the *Tragelaphus*. In these latter points Major Smith is correct.

I will now proceed to the "Antelopes of the Desert" of Mr. Gray, a very well-marked, natural group, consisting of two distinct genera, which have usually been widely separated. Mr. Blyth, however, in the translation of Cuvier's 'Animal Kingdom,' hints at their affinity, and Mr. Waterhouse informs me that he has long held that opinion. Indeed he has placed the species next each other in the Catalogue of the Society's Museum.

ALCELAPHUS.

A large deep impression before the orbit, but no fissure; the masseteric ridge not extending high; the bones of the face lengthened downwards and forwards, and the occiput also prolonged and drawn downwards; the auditory bulla large and prominent, enclosing a large rounded space for the attachment of the stylohyal bone; the basioccipital tubercles high and sharp, the groove between them narrow in front, wide behind, with a flat space between the occipital condyles; the median incisors expanded at their summits; the molars rather small, narrow, and without supplemental lobes, showing, when somewhat worn, a pit in the middle.

Horns placed high, ringed at the base, with double flexures more or less marked.

Hab. Africa.

A. bubalis.
A. Senegalensis.
A. caama.
A. lunatus.
A. pygargus.

I have seen skulls of the three last-named.

Mr. Gray calls a portion of this genus "Boselaphus," doubtless intending *Alcelaphus* of De Blainville, which being antecedent to Major Smith's name *Acronotus*, should certainly be adopted. The genus is a very natural one, and the characters by which Mr. Gray proposes to divide it into two, are by no means sufficient. The last-mentioned species, *A. pygargus*, has usually been placed among the Gazelles, where it was left by Major Smith and by Mr. Blyth, who speaks of it as leading "through *A. Caama*, *Bubalis*, &c. to the Gnus." Mr. Waterhouse, who in the Catalogue of the Society's Museum uses the generic name *Antilope* throughout, places this species

between the Gazelles and the others of its natural genus, to which the Gnu follows. Mr. Gray, who had left it with the Gazelles in the 'List of Mammalia' in the British Museum, has removed it to its true place in his paper in the 'Annals and Magazine.'

CATOBLEPAS.

The general characters of the skull the same as in *Alcelaphus*; but the depression before the orbit less marked; the occiput rather less prolonged, and its base, together with the auditory bulla, broader.

Horns broad at the base, inclining more or less downwards and outwards, and then bent upwards.

Hab. Africa.

C. gnu. *C. taurina.*

The next genus is included by Mr. Gray among his "Caprine Antelopes," but differs from them in having a suborbital sinus or gland, of large size in some species, and of peculiar structure, opening externally by a single pore. Their nasal bones resemble those of the domestic Sheep, and their structure being altogether rather heavy, they might be called *Ovine Antelopes*.

NEMORHÆDUS.

No suborbital fissure; the fossa rounded, shallow, very variable in size, sometimes very minute; the nasal bones rather short and broad, joining the maxillaries only by the interposition of some imperfect ossification or separated from them altogether; the masseteric ridge extending high before the orbit; the auditory bulla very small; the basioccipital bone broad, with moderately developed eminences; the middle incisors slightly expanded at their summits; the molars without supplemental lobes.

Horns rising behind the orbits, annulated and wrinkled at the base, inclined and curved backwards.

Hab. India and its islands.

C. bubalina. *C. Sumatrensis.* *C. goral.*

This genus is too well-marked by nature to admit of subdivision. Although the "tear-bag" is said to be wanting in the *Goral*, there is certainly a slight depression upon the lacrymal bone, and the pore with which the gland opens may be so small in this species as to escape detection in dried specimens; but if it be really absent, the instances of the genera *Gazella* and *Ovis* must warn us against founding a genus solely on the want of this organ, while on the other hand, a difference in its structure seems to be of great zoological importance.

Since the foregoing observations were written, I have perused Mr. B. H. Hodgson's interesting account of the *Budorcas taxicolor*, in the 'Journal of the Asiatic Society of Bengal,' and a glance at the representations of the skull indicates very plainly that it is closely allied to *Nemorhædus*, to which Mr. Hodgson admits certain resemblances, and that it has no relationship with the Gnu, or the Musk Ox. The characters that I assigned to *Nemorhædus* would appear

to serve as well for this new and singular genus, except that there seems to be no suborbital depression, and the masseteric ridge, as may be expected from the general elevation of the skull, does not rise before the orbit. The horns, whose peculiar twist must constitute the diagnosis of the genus BUDORCAS, appear, from the rough figures given, to have the wrinkling at the base very similar to that in *Nemorhædus*.

The following genera may be considered as in some degree allied, and deserve the name of Caprine Antelopes. They have no suborbital sinus, but have a fissure in the skull, and their incisors are not widened at the summits.

RUPICAPRA.

A minute suborbital fissure, but no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla very small and compressed; the basioccipital bone flat; the incisors equal-sized, vertical; the molars without supplemental lobes.

Horns slender, round, vertical, and hooked backwards at the tip.

Hab. Europe.

R. tragus.

DICRANOCERUS.

No suborbital depression; the fissure lengthened; the nasal bones widest posteriorly; the orbit a little elevated above the line of the face, and the masseteric ridge not rising before it; the auditory bulla moderate, compressed and angular; the incisors equal-sized, sloping; the molars without supplemental lobes.

Horns vertical, compressed, with a process on their anterior side, and hooked backwards at the tip.

Hab. North America.

D. Americanus.

APLOCERUS.

Horns round, vertical, gently curved backwards.

Hab. North America.

A. Americanus.

I have seen no skull of this animal, but leave it for the present in this location.

I must forego all notice of the *Ixalus probaton* of Mr. Ogilby, as there is no skull to be seen, and the horns in the only specimen known are quite in a rudimentary condition.

The genera next to be considered are the "Cervine Antelopes" of Mr. Gray, exclusive of the genus *Kolus*, which I have rejected. With the exception of the Nyl-Ghau and some of the *Eleotragi*, they are the only members of the old genus *Antilope* that have well-developed supplemental lobes in all the true molars; they have always been placed near together.

ÆGOCERUS.

A small suborbital fissure, but no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla moderate; the occipital portion of the skull much prolonged; the basioccipital portion widened, its two pairs of tubercles much developed, with a deep groove between them; the incisors gradually increasing in size to the median pair, which are not expanded at their summits; the molars with largely-developed supplemental lobes.

Horns rising immediately above the orbits, curved backwards, annulated.

Hab. Africa.

Æ. leucophæus. *Æ. niger.*

ORYX.

A suborbital fissure, but no fossa, the masseteric ridge not extending high; the auditory bulla large and compressed; the basioccipital bone with its tubercles well-developed; the molars with supplemental lobes.

Horns straight or gently curved, annulated, placed in a line with the face.

Hab. Africa.

O. gazella. *O. leucoryx.*

It is only in Mr. Cumming's collection that I have seen entire skulls of the Gemsbok, and the lower jaw being absent, I could not ascertain the character of the incisors. The skull of the *Leucoryx* I have not seen.

ADDAX.

A small suborbital fissure, but no fossa; the masseteric ridge ascending before the orbit; the auditory bulla large, prominent, and compressed; the basioccipital bone with its anterior pair of tubercles slightly, the posterior well, developed; the median incisors expanded at their summits; the molars with supplemental lobes.

Horns nearly in a line with the face, annulated, spirally twisted.

Hab. Africa.

A. naso-maculata. I have seen but one skull of this animal, and that is a young one, in the Society's collection, still retaining the whole of its milk dentition.

Before proceeding to the Sheep and Goats, the Nyl-Ghau requires to be introduced. It seems to stand alone, not having a decided affinity for any other genus.

PORTAX.

The nasal opening rather small, with the nasal bones small and narrow; a minute suborbital fissure; no fossa, but a smooth line upon the lacrymal bone; the masseteric ridge not extending high; the auditory bulla moderate, bulbous, compressed; the basioccipital

bone with the posterior tubercles moderately developed, the anterior ones scarcely at all; the molars with supplemental lobes.

Horns short, round, vertical, slightly bent forwards.

Hab. India.

P. picta.—The only skull that I have seen (that in the British Museum) wants the incisor teeth, so that I could not ascertain their structure. The smooth line upon the lacrymal bone terminates in a small foramen, but on one side is continued for some distance forwards upon the maxillary bone, where it terminates in the same way; and it may even be faintly traced on the other side for some distance beyond the foramen.

CAPRA.

A small suborbital fissure, no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla prominent and compressed; the basioccipital flat, with its processes developed; the middle incisors not expanded; the molars without supplemental lobes.

Horns erect, compressed; curved backwards and a little outwards, or twisted; annulated or nodulous, and furnished with one or more longitudinal ridges.

Hab. The Northern portions of the Old World.

C. hircus.	*C. Falconeri.*
C. ibex.	*C. jemlaica.*

I do not see sufficient reason for separating the Jemlah Goat, as has been done, under the names of *Hemicapra* and *Hemitragus*.

OVIS.

A more or less marked, rounded, suborbital depression, but no fissure; the masseteric ridge ascending high before the orbit; the auditory bulla small; the basioccipital flat, more or less expanded anteriorly by the extension of the anterior pair of tubercles, the posterior ones small; the incisors nearly equal-sized, sloping; the molars without supplemental lobes.

Horns broad at the base, transversely wrinkled, bent outwards, with a more or less marked spiral curve in a direction contrary to that occurring among the Antelopes, and a longitudinal ridge or angle.

Hab. The Northern hemisphere.

O. ammon.	*O. nahura.*
O. Vignei.	*O. tragelaphus.*
O. aries.	

It is a matter of surprise to me that naturalists should almost universally have given *no* suborbital sinus, as characteristic of the genus *Ovis*, since it is very perceptible in the Domestic Sheep; and in some other species, especially the *O. ammon*, judging by the appearance of the stuffed specimens, and by the fossa upon the skull, it must be of very considerable size. I do not perceive it, however, in the *O. tragelaphus*, nor in the *O. nahura*. Although Mr. Gray maintains the long-established error, the observations of Mr. Ogilby and Mr. Hodg-

son agree with my own in this respect; the latter gentleman, who far exceeds Mr. Gray in the number of generic divisions, even separates *O. nahura* and *O. barhel* as a distinct genus under the name *Pseudovis*, on account of the absence of "eye-pits."

Ovibos.

A small depression in front of the orbit; no fissure; the masseteric ridge ascending before the orbit; the auditory bulla of moderate size; the basioccipital bone broad and flat, with a ridge and a fossa on each side; the anterior part of which is rough; the fossa at the side of the occipital condyle filled up and produced into a blunt process, upon which the articulating surface is continued; the molars without supplemental lobes.

Horns broad at the base, tapering, pressed downwards against the sides of the head, and the points bent upwards.

Hab. The North Polar Regions.

O. moschatus.—This animal, which derives its name from its general aspect being intermediate between that of the Ox and that of the Sheep, has generally been placed among the Bovine forms. Taking the aggregate of its characters, it appears to me to be at least as nearly, if not more, allied to the Sheep, but should most properly stand alone.

The remaining genera constitute the true Bovine type, and agree among themselves in most characters of the skull. I fear that Mr. Gray's distinctions, in the extent of the intermaxillary bones upon the sides of the nasal aperture, will not always hold good. Their general cranial character may be given first;—

No suborbital fissure, nor fossa; the masseteric ridge ascending rather high before the orbit; the auditory bulla moderate, compressed; the basioccipital bone with its tubercles well-developed, and a deep groove between them; the incisors nearly equal-sized, slightly bending outwards, and the molars with well-developed supplemental lobes.

Bos.

Horns placed upon the extremities of the ridge terminating the occipital plane, directed outwards.

Hab. Europe and Asia.

B. taurus. *B. gaurus.*
B. frontalis. *B. bantiger.*

Bison.

Horns round, situated in a plane anterior to that of the occiput, directed outwards and curved upwards.

Hab. The Northern Temperate regions.

B. urus. *B. grunniens.*
B. Americanus.

The last-named species is a true Bison, as the position of the horns,

and the woolly fur, make apparent; the fur being generally more copious, may reasonably be expected to extend further upon the muzzle; and the generality of instances proves that the extent of naked surface may differ in very nearly allied species, and is not sufficient to warrant generic distinction. Therefore I do not think it advisable to adopt the genus *Poëphagus*.

Bubalus.

Horns attached in a plane anterior to that of the occiput, flattened or trigonal, inclined outwards and backwards, with the point bending upwards.

Hab. Southern Asia, its islands, and Africa.

B. buffelus.	*B. depressicornis.*
B. brachycerus.	*B. Caffer.*

Although Major Smith was deceived as to the affinities of the Anoa, later as well as earlier naturalists have assigned it to its true place, and a glance at the stuffed specimen in the British Museum leaves the matter beyond a doubt. I have examined the skull in the Museum of the College of Surgeons, and cannot see that it has even a title to generic distinction. Naturalists seem at all times to have been prone to assign generic rank to whatever was mysterious or difficult to classify, and I can in no other way account for this species being made a genus.

It will be seen that my endeavour has been rather to ascertain and demonstrate whatever natural degrees of relationship exist among the species of this family, than to compose a system for mere convenience of reference; but so far from that being any hindrance to the practical adoption of my views, I think that in arranging the specimens in a museum, or the materials of a work, it will generally be found more convenient to be able to dispose the members of a natural group in whatever order may suit our immediate object, than to be compelled to place them in accordance with the stringent laws of a purely analytical method; and that for the purpose of referring a new species to its true location, when we have not the means of observing all characters that may be necessary for the determination of a series of natural affinities, the external characters which can be assigned to a group when its limits are well made out, will be found sufficient; while on the other hand, not only the external characters, but sometimes even those of anatomical structure, will, in a group which has not been previously subjected to a full and careful examination, be as the letters of an unknown language, often leading into error and confusion.

With regard to nomenclature, I have used such names as I find most generally adopted by later naturalists who have given attention to this subject, generally taking, where I had a choice, such as appeared to have been of earliest date; and as I only enumerate such species as I have seen, I must not be considered, although I have omitted a few which appear to be varieties, as rejecting all that are left out.

2. Description of a new genus of the Family Melaniana, and of many new species of the Genus Melania, chiefly collected by Hugh Cuming, Esq., during his Zoological Voyage in the East, and now first described. By Isaac Lea and Henry C. Lea, Philadelphia *.

Genus Pachychilus †.

Testa conica. Apertura ovata, basi integro. Labrum crassum. Columella supernè incrassata. Operculum suborbiculare, corneum.

The genus *Melania* has been found to embrace such a vast number of species in various parts of the globe, that it has become very desirable to separate any definite group with sufficient persistent characteristics. The thickened lip sufficiently distinguishes the proposed genus from *Melanopsis* and *Melania* ‡. It differs from *Melanopsis* also in its having no sinus, while it resembles it in the possession of a thickened columella above. From *Melania* it differs also in having this callous columella. The species on which it is proposed to found this genus has a mouth looking like a thick-lipped *Bulimus*. The operculum differs somewhat from that of any *Melanian* I have seen. Its polar point is subcentral, from which two or three spiral revolutions are made; then a thinner margin surrounds these spirals.

The animal has not been observed, and may and probably will prove very different from *Melania*. Its proper position, however, in the system will most likely be found to be between *Melanopsis* and *Melania*, and there I would at present place it.

A second and very distinct species may be added to this genus—the *Melania lævissima*, Sowerby, described in Deshayes' edition of Lamarck. It inhabits Colombia, and is a shorter, wider, and much thicker shell, with a large white mouth.

Pachychilus Cumingii. *P. testâ lævi, elevato-conicâ, subcrassâ, nitidâ, fusco-nebulosâ; spirâ elevatâ, acuminatâ; anfractibus undecim, convexiusculis; suturis linearibus; aperturâ parviusculâ, subrotundâ, ad basim rotundâ, intus fuscâ; labro valdè expanso; columellâ supernè incrassatâ.*

Hab. Large rivers, Copan, Central America.

Length 1·4, diam. ·5 of an inch.

Remarks.—This is a very remarkable shell among the *Mélaniens*. It is of fine symmetry, the whorls being very regular to the apex. The brownish cloudiness gives the whole surface a dark hue, while the smoothness of the whorls gives it almost a polished appearance. It differs very much in form from *Melania lævissima*, Sow., which naturally belongs to the same genus, and which is adopted above; but it has the same character of mouth and exterior colour. Both

* All the species described are in the Cabinets of Hugh Cuming and Isaac Lea.

† Παχὺς, *thick*, and χεῖλος, *lip*.

‡ Lamarck describes the family *Mélaniens* as having a sharp outer lip, "le droit toujours tranchant;" but this genus naturally belongs to *Melania*, *Melanopsis*, and *Pirena*.

species under the microscope exhibit very minute revolving striæ. The aperture is rather more than one-fourth the length of the shell. The operculum has its polar point subcentral.

The genus *Melania* of Lamarck abounds in a most extensive number of species, and is undoubtedly the most interesting of the genera of the family *Melaniana*. It is distributed round the whole circumference of the globe, and inhabits the fresh waters of America at least as far north as 45° latitude, and it probably exists quite as far south, as it is found in New Zealand. In the north of Europe there is not a single species known, while very few are found in the southern part of that quarter of the world. In the middle, southern and south-western portions of the United States, the greatest number of species seem to be developed on this continent; and in the States of Kentucky, Ohio, Tennessee and Alabama they are the most profuse, and present an almost endless variety of forms, extending to an incredible number of species. The rivers and lakes of India and Africa have not yet been well explored; but while they present some of the most striking and beautiful species, it may be doubted if they abound in the variety of forms which are found in the United States. The Philippine Islands form a most prolific district, where the development of these forms seems to have been greatly extended. Mr. Cuming, with an industry, energy and perseverance which portray the true naturalist, devoted several years to the Mollusca of this remarkable group of islands, and his reward has been, the discovery of a vast number of species heretofore unknown to science; and he well deserves the gratitude of all students of this branch of natural history for his devotion to the collection of a museum, almost, if not quite, unequalled in the Mollusca.

Melania canalis. *M. testâ lævi, acuto-conoideâ, subtenui, tenebroso-castaneâ, flammis longitudinalibus ferrugineis ornatâ; spirâ elevatâ, ad apicem costatâ; suturis impressis canaliculatisque; anfractibus duodecim, subconvexis; aperturâ ovatâ, ad basim patulâ, intus albidâ.*

Hab. Small streams, island of Guimaras, Philippines.

Length 2·1, diam. ·6 of an inch.

Remarks.—This is rather a large and somewhat robust species. The full-grown specimens are of a dark chestnut-brown, the younger sometimes a pale horn-colour, with longitudinal flammate marks, nearly equidistant, and with distinct minute transverse striæ. The most remarkable character of this species is the impressed and rather sharp channel at the junction of the whorls. The aperture is nearly one-third the length of the shell, and the base is expanded, the columella below being flattened.

Melania fœda. *M. testâ lævi, conoideâ, subcrassâ, tenebroso-fuscâ, rufo-nebulosâ; spirâ subelevatâ; suturis subimpressis; anfractibus decem, planulatis; aperturâ ellipticâ, subcontractâ, ad basim subangulatâ, intus tenebroso-castaneâ; labro margine cæruleascente.*

Hab. Rocky stream, Java.

Length 1·6, diam. ·5 of an inch.

Remarks.—In the adult specimens the edge of the aperture is bluish white, and within more or less brown. In all cases the columella is white in the four specimens under examination. They are covered nearly over the whole surface with a black deposit of oxide of iron. Near the base there are seven to ten indistinct striæ. The aperture is about one-third the length of the shell. The operculum is ovate, and does not present any peculiar character.

Melania sobria. *M. testâ lævi, acuto-conoideâ, subcrassâ, luteo-corneâ; spirâ elevatâ, ad apicem costatâ; suturis impressis; anfractibus duodecim, planulatis; aperturâ parvâ, subovatâ, intus albidâ, ad basim rotundatâ; columellâ regulariter curvatâ.*

Hab. Very small streams, Siquijor, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—A very regularly formed, light-coloured species. There are a few indistinct striæ near the base. The sutures are very regular and thread-like. The upper whorls are slightly maculate, and those nearest to the apex minutely plicate. The aperture is rather more than the fourth of the length of the shell, and is rounded at the base of the columella.

Melania subula. *M. testâ lævi, acuto-conoideâ, tenui, castaneâ; spirâ valdè elevatâ, acuminatâ; suturis impressis; anfractibus duodecim, subconvexis; aperturâ parvâ, contractâ, intus vel albidâ vel rufo-castaneâ.*

Hab. Small river in the province of Ho Ho, isle of Panay, Philippines.

Length 1·8, diam. ·4 of an inch.

Remarks.—This is a delicately formed species, very much attenuated, with six or eight impressed, small striæ at the base. In the darker specimens, the upper part of the whorl at the suture is lighter-coloured than the other part. The upper whorls are finely striate. The aperture is small, about one-fourth the length of the shell, and rounded at the base of the columella.

Melania acus. *M. testâ lævi, conoideâ, subtenui, corneâ; spirâ acuminatâ, ad apicem costatâ; suturis subimpressis; anfractibus undecim planulatis; aperturâ parvâ, ovatâ, intus cærulescente; columellâ regulariter curvatâ.*

Hab. Small stream, Guimaras, Philippines.

Length 1·1, diam. ·3 of an inch.

Remarks.—This is a regularly formed, small species. The specimens under examination are nearly covered with a deposit of oxide of iron, which on removal displays a horn-coloured epidermis. The aperture is nearly one-third the length of the shell, and is rounded at the base.

Melania dermestoidea. *M. testâ lævi, politâ, subcylindraceâ, crassâ, tenebroso-castaneâ; spirâ subelevatâ; suturis impressis; anfractibus sex, subplanulatis; aperturâ ovatâ, ad basim canaliculatâ, intus rufescente; labro incrassato.*

Hab. Seychelles Islands.

Length ·6, diam. ·2 of an inch.

Remarks.—The most marked character of this species is the notched channel of the base, where the colour is rather darker. The outer lip is thick and rounded. The superior part of the whorl in some specimens is lighter in colour. In its general aspect this species resembles *Melania simplex*, Say. The epidermis is very lustrous. The aperture is nearly one-half the length of the shell.

MELANIA CONTRACTA. *M. testâ lævi, ovato-elongatâ, pallidâ, tenui; spirâ elevatâ; anfractibus novem, planulatis; aperturâ ovatâ, constrictâ, ad basim canaliculatâ, intus vel albidâ vel rufâ; columellâ contortâ reflexâque.*

Hab. Seychelles Islands.

Length ·8, diam. ·3 of an inch.

Remarks.—This, like the *dermestoidea*, herein described, from the same locality, is remarkable for the notched channel at the base. They may easily be distinguished by the *contracta* having a more elevated spire, greater number of whorls, being of a lighter colour, and in the aperture being longer and more twisted. There is a disposition in the upper part of the columella to be thickened and rufous, and the twist and backward turn are very remarkable. The aperture is about one-third the length of the shell.

MELANIA FERRUGINEA. *M. testâ lævi, nitidâ, ventricoso-conoideâ, inflatâ, crassâ, ferrugineâ; spirâ subelevatâ; suturis valdè impressis; anfractibus sex, convexis; aperturâ magnâ, subrotundâ, intus albidâ.*

Hab. Zanzibar, East Africa.

Length ·9, diam. ·4 of an inch.

Remarks.—The rather inflated form of this species gives it the aspect of some of the *Paludinæ*. A single specimen, and not an entirely perfect one, has only been submitted for examination. It seems to differ from any described species, while it has no very distinctive character. The aperture is very nearly one-half the length of the shell.

MELANIA IMPURA. *M. testâ lævi, subcylindraceâ, compressâ, subcrassâ, viridi-corneâ; spirâ subelevatâ; suturis valdè impressis; anfractibus planulatis, supra geniculatis; aperturâ ellipticâ, subcontractâ, ad basim retusâ, intus albidâ; columellâ regulariter incurvâ.*

Hab. Naga, province of South Cumarines, Luzon, Philippines.

Length ·9, diam. ·35 of an inch.

Remarks.—The angle on the superior portion of the whorls gives this species a very distinct aspect. This angle is not very acute, but it is very marked in all the four specimens under examination. The apex in each being decollate, the number of whorls cannot of course be correctly ascertained; there may be about seven. The colour of the epidermis is uniform and of a greenish horn-colour. The aperture is rather more than one-third the length of the shell, and is rounded and retuse at the base.

MELANIA COCHLIDIUM. *M. testâ lævi, subulatâ, subcrassâ, rufo-corneâ; spirâ elevatâ, acuminatâ, ad apicem minutè plicatâ; suturis regulariter impressis; anfractibus tredecim, subcompressis, anfractu ultimo supra angulato, magno; aperturâ latè ovatâ, parvâ, ad basim retusâ, intus albidâ; columellâ regulariter incurvâ.*

Hab. Very small streams, islands of Siquijor and Guimaras, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—This is a very remarkable species, having a single elevated, revolving rib on the superior part of the last whorl, which causes a somewhat impressed channel above. The four specimens under examination from Siquijor are fresh and with perfect epidermis, which varies on the younger specimens to rather a pale horn-colour, while the more mature ones are of a reddish horn-colour. The four from Guimaras are "dead shells," rather more robust, with a portion only of the epidermis remaining, which is rufous. The aperture is about one-fourth of the length of the shell. The operculum has its polar point near the base on the left side.

MELANIA CINCTA. *M. testâ lævi, subulatâ, subtenui, rufo-castaneâ; spirâ valdè elevatâ, acuminatâ, ad apicem plicatâ; suturis impressis, linearibus; anfractibus tredecim, subconvexis; anfractu ultimo uno-vittato; aperturâ dilatatâ, ovatâ, intus fusco fasciatâ, ad basim rotundâ; columellâ contortâ.*

Hab. India.

Length 2·2, diam. ·6 of an inch.

Remarks.—The form of this species is very much like that of *Melania aculeus* (nobis), but it is a more attenuate species. The single light band on the lower whorl seems to be peculiar to this species. It is below the middle part of the whorl, and is distinctly visible on the inside in the three specimens under examination. The upper whorls have regular, oblique, somewhat distant folds, on two of the specimens, which are crossed by minute striæ. The lower part of the whorl has indistinct striæ. The aperture is not large, being less than one-fourth the length of the shell, and it is rounded at the base. The columella is much incurved.

MELANIA LANCEA. *M. testâ lævi, subulatâ, subtenui, corneâ; spirâ elevatâ, ad apicem striatâ; suturis impressis; anfractibus duodecim, convexis; aperturâ ovatâ, intus albidâ, ad basim rotundâ; columellâ angulariter incurvâ.*

Hab. Ohcataroa, Society Islands.

Length 1·6, diam. ·5 of an inch.

Remarks.—This species is in form somewhat like the *M. aculeus* (nobis), but is a smaller shell and not quite so attenuate. In the four specimens under examination small striæ are distinctly marked on the superior or younger whorls, and on two of them some of the striæ are continuous on the lower whorls. The aperture is not large, being not quite one-third the length of the shell. The columella is much incurved and recurved.

Melania episcopalis. *M. testâ plicatâ, turritâ, subcrassâ, tenebroso-castaneâ; spirâ elevatâ; suturis impressis; anfractibus subconvexis, propè suturam superiorem concavis; plicis raris, subacuminatis; aperturâ magnâ, ellipticâ, intus cærulescente; columellâ contortâ.*

Hab. A sluggish river, Malacca.

Length 2·4, diam. ·8 of an inch.

Remarks.—This is a remarkable and interesting species, and differs from any which has been described, in having rather large and somewhat distant folds rising on the upper part into nodular points, in all the four specimens submitted for examination. The apex of these specimens being truncated, the number of whorls cannot be ascertained. A perfect adult would probably present about ten. The folds are distinct on the four lower whorls only. On the middle of the lower whorl there is a slightly elevated line, below which are about six obscure striæ. The aperture is large, and more than one-third the length of the shell; it is twisted, and has an elongated base. The columella is whitish and very much incurved. The operculum is more spiral than usual, and the polar point more toward the centre.

Melania blatta. *M. testâ plicatâ, elongatè conoided, crassâ, castaneo-nigricante; spirâ elevatâ, crebrè costatâ; anfractibus planulatis, infra suturas concavis; plicis crebris ornatis; aperturâ magnâ, ovatâ, supernè angulatâ, ad basim rotundâ, intus cæruleâ; columellâ tortâ, supernè incrassatâ.*

Hab. Rapid river and small streams, Luzon, Philippines.

Length 2·6, diam. ·7 of an inch.

Remarks.—A very dark-coloured and remarkably fine species, with numerous, nearly parallel, perpendicular folds, which number some eighteen or twenty, and exist on every whorl in the eight specimens under examination. The four large ones are truncate, but the younger and more perfect would indicate the existence of about ten whorls. It differs from the *episcopalis* in being more attenuate, in having more folds and a much less twisted columella. The aperture is large, and rather more than one-fourth the length of the shell.

Melania costellaris. *M. testâ plicatâ, supernè striatâ, acuminatâ, subcrassâ, tenebroso-castaneâ; spirâ elevatâ; suturis linearibus; anfractibus decem, subplanulatis; anfractu ultimo magno, geniculato; plicis numerosis; aperturâ parvâ, dilatatâ, ovatâ, supernè angulatâ, ad basim rotundâ, intus cærulescente; columellâ incurvâ.*

Hab. Small streams in the islands of Negros, Tanhay, Siquijor; Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—The last whorl being angular gives this species a peculiar and remarkable character, and causes a channel immediately below the suture. Several of the specimens under examination have beautiful delicate impressed lines immediately above the sutures. In the superior whorls these lines cover the whole surface. The folds

terminate on the angle, and are disposed to be nodulous there. The aperture is rounded, angular above, and not quite one-third the length of the shell. The base of the shell is rounded.

MELANIA RECTA. *M. testâ plicatâ, attenuatâ, subcrassâ, tenebroso-castaneâ; spirâ valdè elevatâ; suturis irregulariter impressis, subcanaliculatis; anfractibus tredecim, subplanulatis; plicis numerosis; aperturâ parvâ, ovatâ, ad basim rotundâ, intus cærulescente; columellâ incurvâ.*

Hab. Very small streams, Siquijor and isle of Negros, Philippines.

Length 1·7, diam. ·5 of an inch.

Remarks.—In many of its characteristics this species is like the *M. costellaris*. It differs entirely, however, in the enlargement of the last whorl, the angle on the superior part of it, and in the channel below the suture, which are important characters in the *costellaris*. Nor has it the minute revolving lines. The folds are remarkably regular and distinct, and number about eleven on each whorl in the eight specimens under examination. On two individuals the epidermis remains quite perfect, and is deposited in regular, revolving striæ. The aperture is about one-third the length of the shell; it is rounded below and angular above, where it is slightly set off from the body of the whorl. The columella is but slightly curved.

MELANIA AUSTRALIS. *M. testâ plicatâ, conicâ, tenui, diaphanâ, rubiginoso-corneâ; spirâ costatâ, prope apicem turbinatâ; suturis impressis; anfractibus septem, convexis, ad basim striatis; plicis numerosis; aperturâ magnâ, ellipticâ, intus salmoniâ; columella tortâ; labro supernè emarginato.*

Hab. Victoria river, North Australia.

Length ·9, diam. ·4 of an inch.

Remarks.—This is a very distinct little species, and the sudden enlargement of the third whorl below the apex gives it a somewhat turbinated appearance. The folds do not on the lower whorl reach the suture, and above and below these folds there are minute revolving striæ. The aperture is more than one-third the length of the shell. The outer lip is slightly crenulate and remarkably incurved near to its junction with the body whorl.

MELANIA TORNATELLA. *M. testâ plicatâ, fusiformi, crassâ, corneâ, infernè lineatâ; spirâ acuminatâ; suturis irregulariter impressis; anfractibus novem, convexiusculis, ad apicem mucronatis, in medio concavis; plicis numerosis, crebris; aperturâ constrictâ, elongatâ, intus albâ; labro supernè incisâ; columellâ lævi, crassâ, contortâ, reflexâ.*

Hab. Shallow rivers, Tanhay, isle of Negros, Philippines.

Length ·9, diam. ·35 of an inch.

Remarks.—This belongs to a very remarkable group of *Melania*. The emargination of the outer lip, above the middle of the whorl, is strikingly characteristic of the group. It causes a slight flatness or convexity of the whorl, as well as a curve in the numerous ribs, which cover the whole surface in this species, except where it is superseded

by the transverse lines on the lower part of the whorl. These lines are remarkably parallel, regular and well-impressed, and in the four specimens under examination are six in number. The folds are like ribs, very numerous, closely set, and very distinct. The form of this species, described above, is very like *Tornatella*, and the twist in the columella also resembles that genus. The ribs continue on the apex and give it a scalariform appearance. The aperture is nearly one-half the length of the shell. The edge of the lip, below the emargination, is slightly crenulate. The columella is very thick towards and at the base, where it is so retuse as to permit the inside to be seen. One of the specimens is rubiginose at the base. No operculum accompanied the specimens.

MELANIA RUDIS. *M. testâ plicatâ, subfusiformi, crassâ, corneâ; spirâ subelevatâ; suturis irregulariter impressis; anfractibus planulatis transversim lineis impressis cinctis, supernè canaliculatis; plicis numerosis, crebris; aperturâ parvâ, ovatâ, intus albidâ; labro supernè emarginato; columellâ lævi, subcrassâ, tortâ.*

Hab. Amboyna.

Length 1·1, diam. ·4 of an inch.

Remarks.—Allied to *Melania tornatella*, it forms one of the emarginate group, but differs in the size of the aperture and in the form of the ribs, which are transversely cut by numerous fine lines, in groups, which lines traverse the whole whorls. The aperture is about one-third the length of the shell, and the lip is crenulate. The three specimens under examination are all truncate at the apex, and the number of whorls therefore not ascertained. It has the spiral operculum usual to *Melania*.

MELANIA MICROSTOMA. *M. testâ plicatâ, subfusiformi, subcrassâ, luteo-corneâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus octo, planulatis, transversim lineis impressis cinctis, supernè canaliculatis; plicis numerosis, crebris; aperturâ maximâ, ovatâ, ad basim truncatâ, intus cærulescente; labro supernè emarginato; columellâ lævi, ad basim subcrassâ tortâque.*

Hab. Mountain streams, isle of Negros, Philippines.

Length ·9, diam. ·3 of an inch.

Remarks.—This belongs to the group with emarginate lip, along with *M. rudis* and *M. tornatella*. It is a more slender species, more subulate, and has a smaller aperture than either. It takes more the form of *Terebra*. It has groups of lines which decussate the ribs as in the *rudis*. The aperture is not one-third the length of the shell, and the lip is crenulate. No operculum was received with the shells.

MELANIA TRANSVERSA. *M. testâ plicatâ, pyramidatâ, crassâ, corneâ, castaneo-maculatâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus subconvexis, transversim lineis impressis cinctis; costellis verticalibus raris; aperturâ parvâ, obliquè transversâ, rhomboideâ, intus maculatâ et cærulescente; labro terebræformi, crenulato; columellâ contortâ, supernè incrassatâ, infernè emarginatâ.*

Hab. Guiana.

Length 1·6, diam. ·5 of an inch.

Remarks.—This species is remarkable for the unusual obliquity of its aperture and its auger-shaped lip. In its ribs and decussate striæ it resembles the group consisting of *M. tornatella*, *M. rudis* and *M. microstoma*, but it has not the emarginate lip and therefore does not belong to them. The emargination at the base of the columella is quite a different character, and is very remarkable in this species, representing as it does *the bite* of the auger. The chestnut-coloured spots are small, but so distinct as to mark the interior of the shell, which is white and thick. The two specimens under examination are both truncate at the apex, and the number of whorls not ascertained, probably about ten. The aperture is rather more than one-fourth the length of the shell. The operculum is spiral, with the polar point nearly in the centre and with at least five revolutions, which is unusual with *Melaniæ*. It is allied to *M. truncata*, Lam. (*semiplicata*, Fer.), but is less cylindrical and differs somewhat in the aperture.

Melania maxima. *M. testâ striatâ, elevato-conoideâ, crassâ, corneâ; spirâ valdè elevatâ; suturis linearibus; anfractibus duodecim, planulatis; striis magnis, raris, tenebrosis; aperturâ magnâ, rhomboideâ, intus albidâ; columellâ valdè contortâ.*

Hab. Copan, Central America.

Length 3, diam. 1·1 inches.

Remarks.—This very large species has a remarkable outline, forming a perfectly regular, rather obtuse cone above. The aperture is very large, and in the youngest of the three specimens the coloured striæ are very distinct within. Under the microscope minute revolving lines may be observed over all the whorls. The aperture is rather more than one-third the length of the shell. The operculum has five revolutions and is very much like that of *M. transversa*, the polar point being nearly central.

Melania Mindoriensis. *M. testâ striatâ, elevato-conoideâ, subtenui, pallidâ, ad apicem acuminatâ; spirâ elevatâ; suturis impressis; anfractibus duodecim, subconvexis, striis crebris; aperturâ magnâ, ellipticâ, intus albâ; columellâ incurvatâ tortâque.*

Hab. Small streams, Puerto Galero, isle of Mindoro, Philippines.

Length 1·9, diam. ·7 of an inch.

Remarks.—The outline of this species is very regular, tapering to a fine point. There are five specimens under examination, all of which have raised striæ over the whole of the body whorl. Some of the specimens have the two next whorls ribbed, which ribs, the striæ decussating, form granular elevations. The remaining whorls are perfectly smooth, with a few delicately impressed transverse lines. Some have brown spots, which towards the apex are more numerous and flammate. The aperture is more than one-third the length of the shell. The operculum has its polar point on the lower edge, and the curved lines of growth do not make one-eighth of a revolution.

Melania indefinita. *M. testâ striatâ, elevato-conicâ, sub-*

crassâ, tenebroso-cornea; spirâ subelevatâ; suturis valdè impressis; anfractibus convexis, infra suturas impressis, striis crebris impressis; aperturâ parvâ, ovatâ, intus cærulescente, ad basim rotundâ; columellâ regulariter incurvatâ.

Hab. Naga, Luzon, Philippines.

Length 1·6, diam. ·5 of an inch.

Remarks.—The species has a very close resemblance to the striate varieties of *M. Virginica*, Say. The three adult specimens under examination are truncate, and the number of whorls therefore not ascertainable, but probably about nine. The impressed revolving lines are somewhat distant, regular and delicate. Between these, under the microscope, may be seen very minute revolving striæ. The aperture is about one-fourth the length of the shell. The operculum has its polar point near to the edge of the lower margin.

Melania Luzoniensis. *M. testâ striatâ, conicâ, subtenui, tenebroso-cornea; spirâ erosâ; suturis impressis; anfractibus sex, convexiusculis, transversim lineis rugosis impressis cinctis; aperturâ magnâ, elongato-ellipticâ, intus rubiginosâ; columellâ albâ tortâque.*

Hab. Small streams, Calanang, province of Bai, Philippines.

Length 1·1, diam. ·5 of an inch.

Remarks.—There is no peculiarity in the outline of this species, and the most striking character is perhaps in the impressed lines, which are somewhat distant, having minute numerous wrinkles across the groove. They are very distinctly visible under the microscope, and do not seem to have been observed in any other species. The superior part of the whorls is disposed to be granose, and one specimen has four rows of granules. Immediately under the sutures there is a yellow line. The aperture is one-half the length of the shell. The operculum has its polar point close to the lower margin.

Melania albescens. *M. testâ striatâ, elevato-conicâ, subtenui, albidâ, lineis rufis interruptis ornatâ; spirâ acuminatâ; suturis impressis; anfractibus undecim, planiusculis, lineis transversis vix impressis; aperturâ ovato-oblongâ, intus albidâ, rufo-maculatâ, ad basim rotundâ; columellâ incurvâ.*

Hab. Small streams, isles of Guimaras, Negros and Siquijor, Philippines.

Length 2·5, diam. ·9 of an inch.

Remarks.—This is a very regularly formed and graceful species, with rather a high and tapering spire. The impressed revolving striæ are chiefly on the body whorl. The most striking characteristic is the numerous interrupted delicate brown lines, which cover nearly the whole of the whorls and are closer and better defined towards the apex. In some specimens there are beautiful brown spots on a white ground, below the sutures. The aperture is about one-third the length of the shell. The operculum has its polar point close to the lower margin on the left. There is a very great difference in the size and thickness of the specimens. Some of the old are very large, heavy, and covered with the oxide of iron, showing

beneath a brown epidermis and white nacre. In these the peritreme is very thick, and the columella more remarkably thick than heretofore noticed in any *Melanian*.

Melania hastula. *M. testâ striatâ, nonnunquam plicatâ, elongatè subulatâ, diaphanâ, tenui, fuscâ, striis transversis crebris costulas decussantibus; spirâ acuminatâ; suturis linearibus; anfractibus plano-convexis; aperturâ parvulâ; ovatâ, intus vel fuscâ vel albidâ; columellâ incurvâ tortâque.*

Hab. Various streams of Siquijor, Cagayan, Mindanao, and other Philippine Islands.

Length 3·3, diam. ·8 of an inch.

Remarks.—A very attenuate and greatly varied species, some being smooth with few striæ, others with striæ over the whole surface, and others again with numerous folds. In some of the specimens under examination the apex is eroded in a very unusual manner, the outer portion of the whorls there being so much decomposed as to present little more than the central column. Some of the specimens are dark brown, others are horn-colour with brown spots. There are probably about twelve whorls. Although some of the specimens have more or less distinct, somewhat distant folds, there are others which have no folds whatever. This species is placed among the striate group, as striæ are found more or less developed on every specimen. The striæ immediately below the suture are more deeply impressed and cause a slight groove. A variety from Camiguing is flatter on the whorls and less disposed to plication. The aperture is not quite one-fourth the length of the shell, is rather open and somewhat patulous below. The operculum has its polar point near to the margin on the left.

Melania juncea. *M. testâ striatâ, elongatè subulatâ, tenui, tenebroso-fuscâ, infra suturas luteo-lineatâ; spirâ attenuatâ; suturis valdè impressis, anfractibus undecim, convexis, lineis transversis impressis; aperturâ parvulâ, ovatâ, intus fuscâ; columellâ valdè incurvâ contortâque.*

Hab. Lake of Taal, province of Batanos, and small streams in Luzon, Philippines.

Length 2, diam. ·5 of an inch.

Remarks.—An attenuate and gracefully formed species. Some of the specimens are of a dark rich brown, others are flammate. Two have very small incipient folds on nearly all the whorls, others have a few towards the apex. From the same locality are four specimens, which, while they differ but little in form, are very different in colour, being yellowish, with longitudinal flammate brown marks. This variety answers very closely to *M. flammulata*, Von dem Busch, 'Conchylien,' &c. by Dr. Philippi, tab. 1. fig. 3, 4. The aperture is about one-fourth the length of the shell and is rather small, with a patulous lip having a whitish border. The operculum has its polar point rather near to the margin. Gualtierus (tab. 6. fig. G) gives a drawing of a freshwater shell closely resembling this variety. Another variety is rather thinner, diaphanous, horn-colour, and obscurely maculate.

Melania conulus. *M. testâ minutè et crebrissimè striatâ, conicâ, subtenui, fuscâ; spirâ obtusâ; suturis linearibus; anfractibus septem, planulatis, uno-vittatis; aperturâ elongato-ovatâ, ad basim angulatâ, intus fuscâ; columellâ tortâ.*

Hab. Small streams, Fernando Po, West Africa.

Length 1·4, diam. ·5 of an inch.

Remarks.—This interesting species is remarkable for its peculiar striæ, which cover the whole surface of all the whorls. The lines are irregular, and so minute as to require the microscope to detect them. A little above the middle of the whorl there is an obscure, dark, rather broad band. The middle of the whorl is somewhat angular. The aperture is not quite one-half the length of the shell, and is somewhat angular below.

Melania obruta. *M. testâ striatâ, conoideâ, crassâ, bivittatâ, fuscâ; spirâ subelevatâ; suturis impressis; anfractibus septem, convexiusculis, lineis crebris elevatis; aperturâ parvulâ, subpatulâ, intus albâ et bivittatâ, ad basim emarginatâ et retusâ; labro crenulato et arcuato.*

Hab. ——?

Length 1·3, diam. ·5 of an inch.

Remarks.—In general form and outline this species is very like to the striate variety of *M. Virginica*, Say. It differs in being thicker and in having a crenulate and patulous lip. In the four specimens submitted, the two dark brown bands are beautifully distinct inside, and stop short of the margin. Three specimens have a suddenly enlarged body whorl. Two of the specimens have obscure, longitudinal brown marks. The aperture is about one-third the length of the shell, is very much curved on the edge of the lip, and disposed to be canaliculate at the base. The striæ are coarse and elevated.

Melania turriculus. *M. testâ striatâ, conoideâ, subtenui, obscurè maculatâ, corneâ, spirâ subelevatâ; suturis impressis; anfractibus novem, convexiusculis, lineis subrariis impressis, supernè angulatis; aperturâ parvâ, subconstrictâ, intus albidâ et obscurè maculatâ, ad basim rotundâ; columellâ regulariter curvatâ.*

Hab. Small rivers, Calanang, province of Bai, Luzon, Philippines.

Length 1·2, diam. ·4 of an inch.

Remarks.—This species, like *M. obruta*, resembles in size and outline very closely *M. Virginica*, Say. It differs from the former in being less thick, in being maculate and not banded, and in having impressed lines. It differs from the latter in being maculate, and in being angular immediately under the suture. The aperture is rather more than one-third the length of the shell, angular above and rounded below. The operculum has its polar point somewhat removed from the lower margin.

Melania apis. *M. testâ striatâ, conicâ, tenui, obscurè granosâ, rufo-castaneâ; spirâ obtusâ; suturis irregulariter impressis; anfractibus convexis, lineis paucis elevatis; aperturâ parvâ, sub-*

rotundâ, intus rufâ, ad basim angulatâ; labro repando, rufo-marginato; columellâ incrassatâ.

Hab. Marshy places, Vera Cruz, Mexico.

Length ·8, diam. ·3 of an inch.

Remarks.—Neither of the four specimens under examination are perfect, all being much eroded at the apex. Under the microscope the surface may be observed to be papillose, a character rarely found in this genus, though not very uncommon in *Helix*. The aperture is rather more than one-third the length of the shell and is unusually rotund. The rufous line surrounds the peritreme. The aperture is reddish inside.

Melania Cumingii. *M. testâ striatâ, turritâ, supernè uno-carinatâ, subcrassâ, tenebroso-fuscâ; spirâ valdè elevatâ; suturis regulariter impressis; anfractibus planulatis, lineis raris impressis; aperturâ magnâ, subtriangulari, intus cærulescente; columellâ retusâ contortâque.*

Hab. Very small streams, island of Siquijor, Philippines.

Length 2·5, diam. ·7 of an inch.

Remarks.—This is a very remarkable species. A single specimen only was sent by Mr. Cuming, and this unfortunately is by no means perfect. There is a good deal of ferruginous matter deposited over the surface, and the apex is so much eroded that the number of whorls cannot be well ascertained, perhaps about nine. The turrited form of the shell is very notable. Immediately under the suture there is an elevated and cordlike line, slightly angular on the superior part. Below this the whorl is slightly impressed. Part of the surface is wrinkled by the transverse striæ decussating longitudinal lines. The aperture is about one-third the length of the shell, and remarkable for its triangular form. The columella is unusually white, which shows in contrast with the dark epidermis. The operculum is large and thick, having its polar point near to the lower border.

Melania dactylus. *M. testâ striatâ, valdè elevatâ, supernè costatâ, crassâ, vel fuscâ vel luteo-corneâ; spirâ valdè elevatâ; suturis impressis; anfractibus duodecim, convexis, lineis crebris elevatis ornatis; costellis verticalibus crebris; aperturâ submagnâ, subrotundatâ, intus vel salmoniâ vel cæruleâ; columellâ incrassatâ, salmoniâ tortâque.*

Hab. Small streams in Guimaras, Mindanao, Luzon and Seyte, Philippines.

Length 3·2, diam. 1 inch.

Remarks.—This is a remarkably fine, large, and protean species. There are about two dozen specimens under examination from various islands of the Philippines. The prevailing character of the surface is striate with decussating costæ on the superior whorls; but some specimens have these costæ enlarged on the lower whorls, instead of their having vanished, as on others. Some again have their costæ rising into a series of pointed tubercles. Under the microscope many numerous minute striæ may be observed to revolve parallel with the coarser ones. Another variety is quite smooth on the upper whorls,

with fewer striæ and costæ. This looks like an immature shell. The aspect of these three varieties is quite different, but I do not consider it safe to separate them into species. The aperture is rather more than one-fourth the length of the shell. The operculum is large, having several revolutions, and the polar point is near to the centre.

MELANIA CRENIFERA. *M. testâ granulatâ, acuto-conicâ, subfusiformi, subtenui, corneâ; spirâ granulatâ, acuminatâ; suturis irregulariter impressis; anfractibus novem, convexiusculis, ad basim striatis; aperturâ submagnâ, ovatâ, intus albidâ; columellâ albâ tortâque.*

Hab. Small river in Java.

Length ·9, diam. ·4 of an inch.

Remarks.—Three specimens under examination are all nearly covered with granules, a fourth has but few. It is a very symmetrical little species. The aperture is rather more than one-third the length of the shell. No opercula accompanied these specimens.

MELANIA NANA. *M. testâ granulatâ, conicâ, fusiformi, tenui, diaphanâ, vel corneâ vel fuscâ, rufo-maculatâ; spirâ depressâ, granulatâ; anfractibus sex, subplanulatis, ad basim striatis; suturis irregulariter impressis; aperturâ magnâ, ellipticâ, intus vel albidâ vel fuscâ; columellâ tortâ.*

Hab. Mountain streams, isle of Negros, Philippines.

Length ·6, diam. ·3 of an inch.

Remarks.—The colour varies in this species owing to the number of brown spots, which differ much in different specimens. One of those under examination is horn-coloured, with a few distinct brown spots; another is quite dark in consequence of the multiplicity of them. The largest granules are immediately below the suture, and the line there is disposed to be of lighter colour. The aperture is about one-half the length of the shell.

MELANIA TESSELLATA. *M. testâ granulatâ, elevato-conicâ, crassâ, tenebroso-fuscâ; spirâ elevatâ, crebrè granulatâ; anfractibus planulatis, ad basim striatis; suturis irregulariter impressis; aperturâ parvâ, ellipticâ, constrictâ, crenulatâ, intus tricostatâ, ad basim canaliculatâ; columellâ subrectâ.*

Hab. ——?

Length 1·10, diam. ·4 of an inch.

Remarks.—There is nothing striking in the general appearance of this shell; but in looking into the interior, there will be observed a character which has not been known to exist in any other species—three elevated, revolving ribs, terminating short of the outer lip. The columella is simple, nearly straight, and ends in the angle at the sinus. These remarkable ribs may involve a difference of organic structure of the animal, in which case a new genus would be required for this species. One of the three specimens is entirely white inside, the other two have dark bands. The apex being eroded in them all, the number of whorls cannot be ascertained, probably about nine. The aperture is about one-third the length of the shell. The operculum has its polar point near to the lower margin.

Melania crebrum. *M. testâ cancellatâ, elevato-conicâ, crassâ, tenebroso-castaneâ; spirâ valdè elevatâ; anfractibus decem, convexiusculis, ad basim striis impressis; suturis impressis; aperturâ parvulâ, ovatâ, intus albidâ; ad basim rotundâ; columellâ incurvatâ.*

Hab. Small streams, Guimaras, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—The symmetry of the outline and the extreme regularity of the decussating lines over the whole of the whorls, except at the base, are distinguishing characteristics of this species. The elevated portions between the decussating lines are quadrangular and resemble brickwork. The four specimens submitted are all "dead shells," and are partly decomposed towards the apex. The aperture is rather more than one-fourth the length of the shell.

Melania reticulata. *M. testâ cancellatâ, conicâ, crassâ, pallidâ; spirâ elevatâ; anfractibus septem, planulatis, crassè cancellatis, ad basim striatis; suturis impressis; aperturâ magnâ, trapezoideâ, ad basim angulatâ, intus albâ; columellâ incurvatâ, contortâque.*

Hab. China.

Length 1·8, diam. ·7 of an inch.

Remarks.—This is a very remarkable and distinct species, covered all over, except the lower part of the base whorl, with coarse, somewhat distant decussating striæ, which rise into nodes and form quadrangular areas. Altogether it is a rough Cerithium-looking species. The epidermis is remarkably thin and light-coloured, the upper portion of the spire being quite white in the two specimens under examination. The aperture is more than one-third the length of the shell.

Melania aculeus, Lea. *M. testâ lævi, nonnunquam striatâ vel granulatâ, elongatè subulatâ, crassâ vel subcrassâ, corneâ vel fusco-nigricante; spirâ acuminatâ; suturis linearibus; anfractibus planulatis; aperturâ ovatâ, intus cærulescente; labro expanso.*

Hab. Siquijor, Naga, Cagayan, and others of the Philippines.

Length 2·6, diam. ·7 of an inch.

Remarks.—When this species was described by J. Lea in 1832 (Trans. Am. Phil. Soc.), he had seen but a single specimen, which had neither granules nor striæ. Among the large quantity of this genus taken by Mr. Cuming in his Eastern voyage, were about forty specimens of this singularly protean species. Were there but few, and these as different as many of them are, no one would hesitate to consider them as distinct species. But the large number and extraordinary difference in them enables one, or rather compels one to keep them in a group as curious divergent varieties. When we compare the large smooth variety with the small variety covered with granules, it is difficult to believe that they may have come from a common parent, but the *nuance* is too complete in the series to admit of a doubt.

It was deemed advisable to re-describe this species, so that it might

embrace the various forms which it takes in the specimens now submitted by Mr. Cuming from various localities.

Melania diadema. *M. testâ spinosâ, acuminato-ovatâ, transversim lineatâ, subpapyraceâ, diaphanâ, pallio lutescente; spirâ scalariformi, acutâ; suturâ lineatâ; anfractibus octo, supernè angulatis, planis supra et infra; angulo spinis instructo; spinis magnis, crebris, reguluribus, brevibus, eversis, aliquando decurrentibus; lineis transversis, minimis, decussatis; anfractu ultimo bullato, ad basim lineato; aperturâ magnâ, ovatâ; columellâ albidâ, incurvâ; epidermide hispidâ.*

Hab. Small streams, isle of Guimaras, Philippines.

Length 1·4, diam. ·8 of an inch.

Remarks.—Differs from *M. amarula* in the thinness of its substance, and regularity and closeness of its spines, which are all bent outwards, at a regular angle.

Melania cornuta. *M. testâ spinosâ, elongato-ovatâ, crossâ, fuscescente vel viridescente; spirâ exsertâ, scalariformi, apice truncatâ; suturâ lineari; anfractibus medio angulatis, supernè subconcavis; angulo spinis instructo; spinis magnis, brevibus, incurvis, raris, acutis, basi latissimis, distortis, decurrentibus, anticè canaliculatis; anfractu ultimo magno, ad basim transversim striatulo; aperturâ magnâ, ovatâ; columellâ lacteâ.*

Hab. Madagascar.

Length 1·5, diam. ·9 of an inch.

Remarks.—The spines are short, stout, and irregularly bent, presenting the appearance of horns, and distinguishing the shell from *M. amarula*, which it otherwise somewhat resembles.

Melania acanthica. *M. testâ spinosâ, ovato-turritâ, varicosâ, transversim lineatâ, subtenui, fuscâ; spirâ elongatâ, conicâ, scalariformi; apice truncatâ; suturâ lineari; anfractibus supernè angulatis, varicibus distortis; angulo spinis instructo; varicibus magnis, regularibus, subobliquis, supernè in spinis productis; spinis longis, tenuibus, irregularibus, extortis; lineis transversis, crebris, parvis, subalternantibus; anfractu ultimo parvo, ad basim lineato; aperturâ ellipticâ, infernè effusâ; labro infernè producto; columellâ parvâ, infernè incrassatâ.*

Hab. Manilla and isle of Negros, Philippines.

Length ·8, diam. ·4 of an inch.

Remarks.—Bears some resemblance to *M. scabra*, Férussac, and *M. bellicosa*, Hinds.

Melania zeylanica. *M. testâ lævi, ovatâ, crassâ, nitidâ, albidâ aut virido-fuscâ; badio flammulatâ, spirâ brevi, acuminatâ, apice acutâ, aliquando erosâ; suturâ lineari; anfractibus quinque, convexis, ad suturam superiorem impressis, maculis flammulatis aut sagittatis badiis; anfractu ultimo magno, bullato; basi lævi; aperturâ ovato-rotundâ, supernè angulatâ, infernè rotundatâ, intus albidâ; columellâ magnâ, albâ, supernè incrassatâ, infernè curvatâ.*

Hab. Seychelles and Ceylon.
Length ·9, diam. ·6 of an inch.
Remarks.—The markings are very variable, being sometimes oblique, zigzag lines, extending over the whole surface of the whorls, sometimes sagittate or short zigzag spots in transverse series. Indeed some specimens are of a uniform dark green. The last whorl sometimes has two impressed transverse lines. The mouth is nearly two-thirds the length of the shell.

Melania polygonata. *M. testâ tuberculatâ, elevato-conicâ, striatâ, crassâ, nigrâ; spirâ elevatâ, conicâ, apice erosâ; suturâ pæne obsoletâ, flexuosâ; anfractibus supernè et infernè striatis; medio angulatis; angulo serie unicâ tuberculorum instructo; tuberculis maximis, transversè angulatis, lævibus; striis transversis raris; anfractu ultimo magno; basi crebrè striatâ; aperturâ supernè valdè acutâ, infernè productâ et effusâ, intus albidâ; columellâ albâ, flexuosâ; operculo parvo, subcentrali.*
Hab. Copan, Central America.
Length 3·5, diam. 1·3 inch.
Remarks.—One of the largest and finest of the *Melaniæ*. The upper whorls are generally covered with a thick, smooth deposit, obliterating the sculpture. On them the tubercles appear to degenerate into elevated costæ. The operculum is much smaller than the mouth. The tubercles and striæ sometimes produce brown marks on the columella and inside the aperture.

Melania denticulata. *M. testâ spinosâ, ovato-turritâ, transversim striatâ, denticulatâ, tenui, diaphanâ, ferrugineâ, maculis badiis minutis linearibus; spirâ exsertâ, conicâ, scalariformi, apice acuminatâ; suturâ lineari; anfractibus septem, supernè angulatis, angulo denticulatis; denticulis parvis, acutis, obliquis; striis transversis, parvis, alternantibus, rugosis, maculatis, lineolis longitudinalibus minutissimis decussatis; anfractu ultimo parvo, ad basim striato; aperturâ ovatâ, infernè effusâ; columellâ flexuosâ, tenui.*
Hab. Mountain streams, isle of Negros, Philippines.
Length ·6, diam. ·3 of an inch.
Remarks.—Allied to *M. spinulosa*, Lam., but may be distinguished by its abrupt denticulations.

Melania armillata. *M. testâ cancellatâ, ovato-turritâ, crassiusculâ, graniferâ, viridescenti; spirâ elevatâ, subovatâ, apice acutâ; suturâ parvâ, crenatâ; anfractibus undecim, planatis, propè suturam superiorem angulatis, supernè albidis, costis longitudinalibus obliquis graniferis crebris; granulis rotundatis, albidis; anfractu ultimo supernè compresso, infernè subturgido; basi transversè striatâ; aperturâ ovatâ, supernè acutè angulatâ, infernè rotundatâ et effusâ; labro infernè producto; columellâ infernè angulatâ, supernè rectâ.*
Hab. India.
Length 1·4, diam. ·5 inch.
Remarks.—Immediately below the angle of the whorls there is

apt to be a larger series of granules, with a very small one succeeding it.

Melania cochlea. *M. testâ subspinosâ, turritâ, costatâ, striatâ, tenui, fulvâ, maculis badiis; spirâ scalariformi, ovato-acuminatâ, apice acutâ; suturâ lineari; anfractibus decem, infernè subconvexis, supernè angulatis et concavis; costis obliquis, longitudinalibus, anfractuum in angulo elevatis et acutè mucronatis, supernè vix obsoletis; striis transversis, minutis, aliquando obsoletis; anfractu ultimo parvo, ad basim striato; aperturâ ovatâ, supernè acutâ, infernè effusâ.*

Hab. ——?

Length 1·, diam. ·4 of an inch.

Remarks.—On the last whorl of the only specimen submitted, the costæ are almost obsolete. The striæ are strongest near the sutures, and scarcely visible at the middle of the whorls.

Melania lateritia. *M. testâ cancellatâ, acutè ovatâ, compressâ, crassiusculâ, striatâ, graniferâ, albidâ, virido-fuscâ, rufo fasciatâ aut atrâ; spirâ elevatâ, plerumque scalariformi, apice acutâ aut erosâ; suturâ impressâ, crenatâ; anfractibus decem, planatis, supernè angulatis, supra angulum sæpe albidis; striis transversis crebris graniferis; granulis quadratis, abruptis, planatis, seriebus longitudinalibus positis; anfractu ultimo magno, subcompresso; basi graniferâ; aperturâ ovatâ, supernè acutè angulatâ et sinuatâ, infernè latâ, expansâ et retusâ, internè sæpe fasciatâ; columellâ contortâ; operculo parvo, ovato.*

Hab. Philippines.

Length 1·6, diam. ·7 of an inch.

Var. *α. Anfractibus supernè graniferis, infernè striis transversis impressis; basi vix lævi, striis raris.*

Var. *β. Striis graniferis alternantibus.*

Remarks.—A very variable species as to size, colour and sculpture. The operculum differs much in some individuals in both its shape and apex. This shell bears some resemblance to the *M. granifera*, Lam. Its most remarkable characteristic is its square, flattened granules, bearing some resemblance to brickwork.

Melania modicella. *M. testâ lævi, ovato-conicâ, crassâ, nitidâ, virido-fuscâ; spirâ conicâ, brevi, apice acutâ, sæpe erosâ; suturâ lineari; anfractibus quinque, convexis, rapidè crescentibus, prope suturam superiorem depressis, prope suturam inferiorem striis parvis transversis duabus aut tribus; anfractu ultimo magno, medio striis tribus, basi lævi; aperturâ ovato-rotundâ, supernè subangulatâ, infernè subeffusâ, intus albidâ; labro acuto; columellâ lacteâ, curvatâ; operculo ovato, subcentrali, concentrico.*

Hab. Timor.

Length ·7, diam. ·5 of an inch.

Remarks.—This shell and the *M. zeylanica* may perhaps be taken as the types of a new genus or subgenus. Further investigation with respect to the animal may decide; in the meantime, the name of

Rivulina is proposed provisionally. The general outline and operculum are those of the Paludina. In old specimens the peritreme of the mouth is continuous, but there is only a slight depression behind the columella in place of an umbilicus. The upper whorls are occasionally faintly lined or spotted with brown.

Melania pagoda. *M. testâ spinosâ, turritâ, costatâ, transversim striatâ, tenui, diaphanâ, corneâ, maculis badiis minutis linearibus; spirâ elongatâ, subovatâ, acuminatâ, scalariformi; suturâ lineari; anfractibus decem, supernè angulatis et subconcavis, angulo spinulosis; costulis obliquis longitudinalibus, infernè obsoletis, supernè in spinulas aut denticula eversa productis, in anfractibus superioribus crebrissimis et magnis, inferioribus minoribus rarioribusque; striis transversis, parvis, crebris, alternantibus, maculatis, lineolis longitudinalibus decussatis; anfractu ultimo usque ad basim striato; aperturâ ovatâ, supernè acutâ, infernè effusâ.*

Hab. Isle of Guimaras, Philippines.

Length 1·4, diam. ·6 of an inch.

Remarks.—A beautiful little species, with irregular spines, very strongly marked on the upper whorls, but which sometimes diminish to denticulations on the lower. It can be mistaken for none of its congeners, except perhaps the *M. cochlea*.

3. Description of five new species of Anodontæ, collected by H. Cuming, Esq. in the East Indies. By Isaac Lea.

Anodonta gracilis. *A. testâ latâ, subcylindraceâ, inæquilaterali; valvulis tenuibus; natibus subprominentibus; epidermide luteâ; margaritâ vel albâ vel purpureâ.*

Hab. Dingle, Isle of Panay.

Diam. 1; length 1·7; breadth 3·4 inches.

Remarks.—This species is more cylindrical than is usual with the *Anodontæ*, and differs from the other species taken by Mr. Cuming in this character: it is rounded anteriorly, and is subangular posteriorly. The dorsal margin is nearly straight, the basal margin is slightly emarginate, the disc being disposed to be flattish. In the specimens under examination, the beaks are all more or less eroded, but in the youngest there are slight indications of undulations. The ligament is thin and long; the marks of growth are distant and rather dark, and the epidermis in the young is yellow or greenish, in the older it is darker and brown; the anterior cicatrices are distinct; the dorsal small, and placed in the cavity of the beaks.

The five species herein described are remarkable in the character of the dorsal line, which rises immediately under the margin into a dentoid line, somewhat lamellar, and approaching in its character the more distinct tooth of the genus *Dipsas* (Leach). In the younger specimens this is much more distinctly marked, and in the older it becomes obsolete. This group of *Anodontæ*, having this dentoid character, would seem to form a natural connexion on one side with

the genus *Dipsas*, and on the other with the genus *Unio*, connecting with *U. Bengalensis*, brought by Dr. Burrough from India, and described by me in the 'Trans. Am. Phil. Soc.' vol. vi. pl. 2. fig. 3. This peculiar form of tooth, if it may so be called, is peculiar to that part of the world, so far as my observation extends; for among the numerous species examined by me from Europe, Africa and America, South as well as North, I have never met with this character developed as in those alluded to above.

Anodonta crepera. *A. testâ ellipticâ, subcompressâ, inæquilaterali; valvulis tenuibus; natibus subprominentibus; epidermide tenebroso-fuscâ; margaritâ vel albâ vel purpureâ.*

Hab. Bongabon, Luzon, Philippines.

Diam. 1·1; length 1·8; breadth 3·3 inches.

Remarks.—Five of the six specimens under examination are purple, the sixth whitish. The outline is nearly oval. One of the specimens is obtusely biangular posteriorly; the substance of the shell is slightly thickened anteriorly; the beaks are too much eroded to observe any undulations; the ligament is rather short and thin; anterior cicatrices distinct; dorsal cicatrices small, and placed in the centre of the cavity of the beaks. The species is closely allied to *A. tenuis*, but is not quite so thin and is more transverse. Three specimens of the young have a well-defined anterior lamellar tooth and a distinct posterior raised line, which in the left valve is slightly divided. This is so marked in these young specimens, that one would scarcely hesitate to place them among the *Uniones* if we had not the adult, which have scarcely a vestige of the elevation on the dorsal line.

Anodonta tenuis. *A. testâ ellipticâ, compressâ, inæquilaterali; valvulis pertenuibus; natibus subprominentibus; epidermide tenebroso-fuscâ.*

Hab. Sual, Luzon, Philippines.

Diam. 1; length 1·7; breadth 3 inches.

Remarks.—This is very closely allied to *An. crepera* herein described, and may, perhaps, when more specimens of the old and young of both species are compared, prove only to be a variety. The specimens before me, however, differ in the *tenuis* being rather thinner and less elliptical, the outline inclining to oblong. The existence of teeth in the young, and the rudiments on the dorsal line in the adult, are very similar to the *crepera*. Of the four specimens before me, two have the nacre purple and two white. The beaks are too much eroded to observe any marks of undulations. The ligament is rather long and thin. Anterior cicatrices distinct; dorsal cicatrices small, and placed in the centre of the cavity of the beaks.

Anodonta subcrassa. *A. testâ oblongâ, subinflatâ, subæquilaterali; valvulis subcrassis; natibus prominentibus undulatisque; epidermide luteo-fuscâ; margaritâ albidâ, colore salmonis tinctâ et iridescente.*

Hab. Laguna de Bai, Luzon, Philippines.

Diam. 1·2; length 1·7; breadth 2·9 inches.

Remarks.—It is rare to meet with an *Anodonta* of the thickness of this species, but it still is not so ponderous as the *arcuata*, Fer., or as *lato-marginata* (Nobis). It cannot be confounded with either of these species, not being arcuate, and not having compressed beaks like the former, and being oblong and thinner than the latter, as well as also being destitute of the broad margin. The substance of the shell is slightly thickened anteriorly, and the basal margin is emarginate; the beaks are submedial, and when perfect are beautifully ornate with numerous small folds which form an acute angle from the point of the beaks, nearly parallel to the line of the umbonal slope; the ligament is short and rather thick; anterior cicatrices distinct; dorsal cicatrices large, and placed in the cavity of the beaks. The colour of a single young specimen before me is salmon inclining to purple, and the adults have the cavity of the beaks tinted in this manner. In the young specimen the lamellar line on the dorsal margin is very well defined, in the adults this character is nearly obliterated.

Anodonta Cumingii. *A. testâ elliptică, compressâ, inæquilaterali; valvulis subcrassis; natibus vix prominentibus; epidermide atro-fuscâ; margaritâ albâ et iridescente.*

Hab. Malacca.

Diam. 1; length 1·9; breadth 3 inches.

Remarks.—This is an interesting species, and remarkable in the form of the dorsal line, which is thickened and raised immediately under the beak, where it is slightly incurved. This disposition to form a curve tooth reminds us of that group of *Naïades* which M. D'Orbigny discovered in the rivers of South America, and which comprise his genus *Monocondylæa*. In fact, this species forms a perfect link between the *Anodontæ* and his genus, and it is allied very closely to that species of this group which I described in the 'Trans. of the Am. Phil. Soc.' vol. viii. pl. 18. fig. 39, under the name of *Margaratina Vonderbuschiana*, from Java. The form of the tooth of the *M. Bonellii* also approaches to these. The anterior margin of the *Cumingii* is rounded, the posterior is somewhat biangular; the anterior cicatrices confluent; the dorsal cicatrices form a line across the cavity of the beaks. In all the four specimens under examination, the beaks are too much eroded to observe any undulations. An unusually dark line marks the course of the pallial impression.

4. Note on Tragelaphus Angasii. By Mr. Proudfoot.

The skins which I exhibit to the Society are those of an old ram and of a young female Antelope, which I shot on the banks of the Mapoota River, about sixty miles above its embouchure into Delagoa Bay. This river flows through the country of Mankazána, king of the Mathlengas (or Cutfaces), which people call this animal *Inyala*.

It is also found on another river called Umcoozi, running into St. Lucie Bay in the territory of Umpauda, king of the Zoolu, but very rarely.

On the Mapoota the Inyala are more numerous, and occur in small troops, composed of one ram and four or five females with their young.

They are always found in the densest bush: they browse chiefly on shrubs, and resemble the Bush-buck in their general habits.

The average height of an adult male is within a third of an adult Koodoo, and very much above that of a Bush-buck.

The female has no horns, resembles a female Koodoo in form, and is rather smaller in size.

July 23, 1850.

W. Yarrell, Esq., V.P., in the Chair.

The following papers were read:—

1. On new species of Birds from Australia. By J. Gould, F.R.S., F.Z.S. etc.

On the present occasion I propose to characterize seven more of the novelties sent home by Mr. MacGillivray, Naturalist to H.M.S. 'Rattlesnake.' *Vide* Proceedings, 1849, p. 109.

Tanysiptera Sylvia.

Bill and feet sealing-wax red; crown of the head, wings, and five lateral tail-feathers on each side blue; ear-coverts, back of the neck and mantle black; in the centre of the latter a triangular mark of white; rump and two middle tail-feathers pure white; all the under surface cinnamon-red.

Total length, 15 inches; bill, $1\frac{1}{2}$; wing, $3\frac{5}{8}$; lateral tail-feathers, 3; middle tail-feathers, $9\frac{1}{8}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *T. Dea*. Fine specimens are contained in the British Museum collection.

Halcyon (Syma?) flavirostris.

Bill fine yellow, passing into brown at the tip; crown of the head, back of the neck, ear-coverts and flanks cinnamon-red; at the back of the neck a narrow, broken collar of black; throat and lower part of the abdomen tawny white; back and wings sordid green; rump and tail greenish blue.

Total length, 7 inches; bill, $1\frac{7}{8}$; wing, 3; tail, $2\frac{1}{2}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

Remark.—Smaller, but nearly allied to the *Syma Tirotoro* of M. Lesson. Some specimens have the crown of the head black. Fine specimens are contained in the collection at the British Museum.

Drymodes superciliaris.

Lores white; immediately above and below the eye a black mark, forming a conspicuous moustache; crown of the head and upper surface reddish brown, passing into chestnut-red on the rump and six middle tail-feathers; remainder of the tail-feathers black, tipped with white; wings black, with the base of the primaries and the tips of the coverts white, forming two bands across the wing; throat and